Memorandum

New York City Transit

Date July 31, 2007

To Michael A. Lombardi, Senior Vice President, Department of Subways

From Cheryl E. Kennedy, Vice President, Office of System Safety

Re **BOARD OF INQUIRY REPORT:**
TRACK WORKER D. BOGGS, PASS #080662
FATAL ACCIDENT, APRIL 24, 2007

On April 24, 2007, the Office of System Safety investigated the fatal accident that occurred to Track Worker D. Boggs on Track 2 north of the 59th Street Station on the Seventh Avenue Line.

Based on a review of the attached report, please provide a response to the recommendations within thirty days.

cc: H. H. Roberts Jr.
P. Fleuranges

FATAL INJURY

TRACK WORKER

DANIEL BOGGS, PASS # 080662

APRIL 24, 2007

BOARD OF INQUIRY

FINAL REPORT

JULY 31, 2007

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EXECUTIVE SUMMARY

At 22:00 hours on April 24, 2007, a group of Track Workers (T/W) reported for duty at the 50th Street and 6th Avenue Division of Track (DT) quarters. The gang of T/Ws was assigned to perform rail renewal on Track 2 adjacent to the 59th Street station on the 7th Avenue Line. This work was to be performed during General Order (G.O.) 1409-07 that was scheduled to start at 23:00 hours. DT Maintenance Supervisor Level II (M/S II) Hall assigned T/W Boggs and T/W Denton to display adjacent track flagging in the vicinity of 59th Street station in anticipation of performing rail renewal activities at the commencement of G.O. 1409-07. Upon arrival at 59th Street station, M/S II Hall furnished T/W Boggs and T/W Denton with flagging lamps. The T/Ws descended to the Right of Way north of the 59th Street station and began to establish adjacent track flagging. The T/Ws displayed 3 yellow lamps at column #243 + 25 on Track 1. T/W Boggs and T/W Denton then crossed the two express tracks and displayed a single green flagging lamp at column #243+25 on Track 4.

As the T/Ws were in the process of establishing adjacent track flagging, Work Train (W/T) 2A passed their position. W/T 2A was assigned to support track construction activities that would have been performed during the general order operation and under normal circumstances G.O 1409-07 should have went into effect at 23:00 hours. However, at 23:00 hours, the 22:28 #1 train out of 242nd Street experienced a Brakes in Emergency (BIE) at 66th Street on Track 1, therefore, the implementation of G.O. 1409-07 was delayed and southbound revenue service was rerouted to Track 2. T/W Denton testified at the Board of Inquiry that based upon the presence of the W/T 2A within the G.O limits, he was of the belief that G.O. 1409-07 was in effect.

At approximately 23:20 hours, T/W Boggs and T/W Denton reversed their direction of travel and were returning to the 59th Street southbound local platform to retrieve additional lamps to display adjacent track flagging at the south end of 59th Street station. The employees began walking from east to west with T/W Boggs in the lead and T/W worker Denton trailing a few feet behind him. T/W Boggs stepped from Track 3 onto Track 2 and was struck by the 22:51 #3 train out of 148th Street resulting in T/W Boggs sustaining a fatal injury.

M/S II Hall heard T/W Denton shouting, "Boggs got hit," "Boggs got hit" and responded to the incident area. M/S II Hall observed a train shoe in contact with T/W Boggs' body. M/S II Hall attempted to remove third rail power by activating the lever on the Emergency Alarm (EA) box at the north end of 59th Street station. M/S II Hall recognized that his attempt to remove the third rail power was unsuccessful due to the fact that temporary lights that are powered by the third rail remained illuminated. The EA box was not functioning as intended and did not remove power.

Rapid Transit Operations (RTO) Desk Superintendent (D/S) Allen located at the Rail Control Center (RCC) was contacted via telephone by DT M/S I Larrier who was also at 59th Street during the incident. M/S I Larrier requested the removal of third rail power. D/S Allen contacted the System Operator (S/O) and coordinated the third rail power removal operation.

The New York City Police Department (NYPD) personnel, Fire Department of New York City (FDNY) personnel and Emergency Medical Service (EMS) personnel were notified of the incident and responded to the scene to render assistance.

On April 27, 2007, a Board of Inquiry was convened at the direction of Howard H. Roberts Jr., President, to examine the facts of this case, determine causal factors, and make recommendations to avoid recurrence. Upon completion of the Board's investigation, it was determined that it is most probable that T/W Boggs may have shared the same belief as T/W Denton that G.O 1409-07 was in effect on Track 2. Consequently, Mr. Boggs may have believed that there would not be any additional revenue trains operating southbound when he stepped onto Track 2 and sustained the fatal injury. T/W Boggs did not look in each direction to ensure Track 2 was safe to enter before stepping onto the track.

Contributing to this accident is the fact that communication capabilities were hampered as not all personnel who supervise and/or perform activities on the Right of Way are required to be issued radios. There are deficiencies in the procedures utilized by the DT in coordinating G.O. activities. M/S II Hall who was in charge of coordinating the adjacent track flagging activities as well as coordinating the work to be performed by the gang did not adequately provide a safe work environment for the employees directly under his supervision and did not follow established flagging procedures.

The Medical Examiners (M/E) Office determined Mr. Boggs expired due to injuries sustained from blunt force trauma. Electrocution was not a factor in his death. However, although non-contributory to this fatality, deficiencies in the Electronic Maintenance Division (EMD) practices with regard to non-operational Emergency Alarm boxes were identified. A review of the communication cable list revealed there are instances where defective cables in control of safety critical circuits such as EA boxes are not repaired for a prolonged period of time.

As a result of the Board of Inquiry, it is recommended that the deficiencies identified during the course of this investigation be addressed and corrected.

Following is a detailed summary of the investigation.

I. INITIAL INVESTIGATION

A. Background

At 22:00 hours on April 24, 2007, a group of T/Ws reported for duty at 50th Street and 6th Avenue DT quarters. M/S II Hall gave the T/Ws a tool box safety talk, discussed the Rule of the Day, and gave the employees a pre-job meeting, which outlined the work that would be performed. The gang of T/Ws was assigned to perform rail renewal on Track 2 adjacent to the 59th Street station on the 7th Avenue Line. This work was to be performed during G.O. 1409-07 that was scheduled to start at 23:00 hours.

In addition, six members of the gang were assigned to perform flagging activities. The T/Ws were divided into three teams of two persons. M/S I Larrier dispatched one team to secure the northern limits of G.O 1409-07 with red flagging lamps and a portable train stop. M/S Larrier also dispatched a second team to perform a similar function at the southern limits of G.O. 1409-07. M/S II Hall assigned the third team consisting of T/W Boggs and T/W Denton to display adjacent track flagging in the vicinity of 59th Street station in anticipation of performing rail renewal activities at the commencement of G.O. 1409-07.

B. Incident

Upon arrival at 59th Street station, M/S II Hall opened a tool box located on the southbound local platform and T/W Boggs and T/W Denton retrieved 3 yellow and 1 green flagging lamps. The T/Ws descended to the Right of Way north of the 59th Street station and began to establish adjacent track flagging. M/S II Hall did not contact the RCC prior to dispatching the T/Ws to establish adjacent track flagging. M/S II Hall instructed the T/Ws to install the 3 yellows on Track 1 first and then instructed the T/Ws to install the green lamp on Track 4. In order to carry out these instructions T/W Boggs and T/W Denton crossed the two express tracks to place the green lamp on Track 4. Additionally, by selecting this route, they would be crossing the express tracks again to return to the platform at 59th Street to retrieve additional lamps for the opposite end of the work area.

The T/Ws displayed the 3 yellow lamps at column #243 + 25 on Track 1 (the downtown local track) to provide adjacent track flagging protection for Track 2 (the downtown express track). T/W Boggs and T/W Denton then crossed the two express tracks and displayed the single green flagging lamp at column #243+25 on Track 4 (the uptown local track) to provide adjacent track flagging protection for additional track work scheduled to be performed under G.O 1411-07 on Track 3 (the uptown express track). As the T/Ws were in the process of performing these actions, W/T 2A passed their position.

W/T 2A was assigned to support track construction activities performed during the general order operation and under normal circumstances G.O. 1409-07 should have went into effect at 23:00 hours. However, at 23:00 hours, the 22:28 #1 train out of 242nd Street experienced a Brakes in Emergency (BIE) at 66th Street on Track 1, therefore, the implementation of G.O. 1409-07 was delayed and southbound revenue service was rerouted to Track 2.

Train Operator (T/O) Lewis, who was performing the flagging functions on board the south end of W/T 2A, stated that W/T 2A stopped abreast of the 59th Street station at which time he informed M/S II Hall that there was a problem on the local track and the southbound service may be continuing on the express track. In addition, he informed M/S II Hall that W/T 2A would be proceeding south and would have to be turned back north, so that he could eventually be in position for the general order. M/S II Hall gave a conflicting version of this conversation, stating that he was informed by T/O Lewis that W/T 2A was being sent to Chambers Street. M/S II Hall then notified T/O Lewis that he would not need W/T 2A until the end of the night. After participating in this conversation, M/S II Hall proceeded to the north end of the southbound platform at 59th Street and descended the platform ladder to Track 1. It should be noted that M/S II Hall did not have equipment to communicate this information to the track workers.

M/S II Hall stated that his intention was to turn on the temporary lighting at the work area to illuminate the tracks where T/W Boggs and T/W Denton were setting up adjacent track flagging in order to provide them with greater visibility. M/S II Hall proceeded to a column adjacent to the north end of the southbound platform located between Track 1 and Track 2 where the switch for the temporary lighting was mounted. M/S II Hall activated the switch and illuminated the work area.

At approximately 23:20 hours, T/W Boggs and T/W Denton reversed their direction of travel and were returning to the 59th Street southbound local platform to retrieve additional lamps to display adjacent track flagging at the opposite end of the work area, which would have been at the south end of 59th Street station on Track 1 and Track 4. The employees began walking from east to west with T/W Boggs in the lead and T/W Denton trailing a few feet behind him. T/W Boggs stepped from Track 3 onto Track 2 and was struck by the 22:51 #3 train out of 148th Street, (Consist:S/M-1550-1549-1548-1547-1546-1505-1504-1503-1502-1501) which resulted in T/W Boggs sustaining a fatal injury.

T/O Pouncy operating the 22:51 #3 train out of 148th Street provided the following account of the incident. T/O Pouncy reported that prior to leaving 72nd Street station; the RCC informed him that there was going to be personnel on the tracks investigating a BIE at 66th Street. T/O Pouncy stated that from the time he was north of 66th Street until he was north of 59th Street, he sounded his horn approximately every 100 feet and was operating at a speed of 10 miles per hour. T/O Pouncy stated that he continued to maintain this speed due to banks of lights illuminated in the area and common sense dictated that he proceed with caution. T/O Pouncy stated that a track worker walked in front of his train with his back toward the train. T/O Pouncy saw the track worker's head turn toward Track 3, as if someone said something to him. The TWU BOI member does not agree and asserts that T/W Boggs was probably looking for a reverse move by the work train as he believed the G.O. was in effect. T/O Pouncy estimated that there was only a distance of approximately 5 to 8 feet between them. T/O Pouncy was utilizing the train brake at the time and upon observing the track worker, he placed the train into emergency. However, this action did not prevent his train from striking T/W Boggs. T/O Pouncy then notified the RCC and the conductor aboard his train of the incident.

M/S II Hall heard T/W Denton shouting, "Boggs got hit," "Boggs got hit" and responded to the incident area. M/S II Hall observed the train shoe of the first south truck of the second car in contact with T/W Boggs' body. M/S II Hall went to EA box 2124 at the north end of 59th Street station on Track 4 and attempted to remove third rail power by pulling down the lever. M/S II Hall recognized that his attempt to remove the third rail power was unsuccessful due to the fact that temporary lights that are powered by the third rail remained illuminated. The EA box was not functioning as intended and did not remove third rail power.

The RTO radio transmission at the time that T/O Pouncy reported the incident is time stamped as 23:19:53 hours. D/S Allen, located at the RCC, was contacted via telephone by DT M/S I Larrier who was also at 59th Street during the incident. M/S I Larrier requested the removal of third rail power at 23:21 hours. D/S Allen contacted the S/O and coordinated the third rail power removal operation. D/S Allen reported that power was removed on Track 2 at 23:24 hours. In addition, power was removed on Track 1 at 23:39, Track 3 at 23:35 and Track 4 at 23:35 respectively. A review of the S/O Operation Log confirms D/S Allen's account of times that power was removed, however the S/O log showed power off on Track 1 at 23:38, which is a minor discrepancy of one minute earlier when compared to the RCC records.

NYPD, FDNY and EMS personnel were notified of the incident and responded to the scene. Upon their arrival, FDNY personnel entered the tracks in an attempt to render immediate assistance to T/W Boggs. The third rail power on Tracks 1, 3, and 4 was still alive at the time. The FDNY

regulations prohibit their personnel from operating on electrified railroad tracks while power is on, unless human lives are in imminent peril and direct and immediate action is required to save lives. The FDNY determined that T/W Boggs was deceased and his body was eventually placed in a body bag and relocated to the northbound local platform.

Post incident investigation at the accident site by the Office of System Safety (OSS) personnel determined that the point of impact between T/W Boggs and the 22:51 #3 train out of 148th Street to be at survey marker 242+70 on Track 2. After making contact with the train, T/W Boggs was propelled 39 feet south from repeated contact with the train and came to rest at approximately survey marker 242+31. The 22:51 #3 train traveled an additional 1 and 1/3 car lengths beyond T/W Boggs' final resting position before coming to a stop. When the train came to rest the #3 shoe beam of the #2 truck (lead south truck of the second car) of car 1549 was wedged on top of T/W Boggs.

Additional post incident investigation by OSS was performed at Livonia Yard on Track 20 where the 22:51 #3 train had been stored after the incident. The inspection of the train revealed evidence of blood and human tissue on the #2 wheel of the #1 truck of car 1550, which was also the lead south car of the consist. There was also evidence of blood on the journal box and on the #8 wheel of the #2 truck of car 1549, which is the second south car of the consist.

C. Location

The accident occurred north of the 59th Street Station on the 7th Avenue line on Track 2, which is the southbound express track. There are four tracks in the area numbered, from west to east: Track 1, Track 2, Track 3 and Track 4. The track in this area is of the type I Track design. Type I Track is a ballast type of track designed for use in structures which have a concrete floor of adequate dimensions as well as adequate clearances for the raising and tamping of track. Track 2 at 59th Street is undergoing track rehabilitation. The immediate area that T/W Boggs traversed to cross from Track 3 to Track 2 was in a state of good repair with no defects observed.

D. Division of Track

Flagging protection is a means of communication between a train operator and employees on the tracks. Flagging protection serves two basic functions. Flagging provides a uniform method and procedure for protecting employees working on or adjacent to the track and to ensure the safe passage of trains through a designated area. The New York City Transit rule book entitled "Rules and Regulations Governing Employees of MTA New York City Transit, Manhattan and Bronx Surface Transit Operating Authority and South Brooklyn Railway, 3.71. (b) (formerly 82b) states, "Before entering upon any trackway, each employee must be familiar with General Order information distributed by his/her subdivision. He/she must verify that such information is current by contacting the tower in the area, or the Control Center Desk Superintendent."

In this instance M/S II Hall did not call the RCC to inform them that he was entering the track to establish adjacent track flagging at 59th Street. In discussions between OSS and DT management it was determined that the DT management's perception was that after notifying the RCC that the G.O. would be secured, no additional phone calls were required in regard to establishing adjacent track flagging. Additionally, M/S II Hall instructed T/W Boggs and T/W Denton to first install the 3 yellow lamps on Track 1. This is procedurally incorrect. The correct sequence is to display the green lamp first. However, of greater significance is the fact that in order to carry out these

instructions T/W Boggs and T/W Denton crossed the two express tracks to place the green lamp on Track 4. Additionally, by selecting this route, they would be crossing the express tracks again to return to the platform at 59th Street to retrieve additional lamps for the opposite end of the work area. The supervisor in charge of the work is responsible to identify the safest route possible for workers to take when performing their duties.

In addition, the protocol used by DT personnel to secure general order limits requires the Supervisor in charge to make an initial phone call to the RCC in which the Supervisor conveys his intent to work under the general order and provides the RCC with information pertinent to the specific general order. The supervisor then dispatches personnel to secure the G.O limits. These individuals will install the red lamps and portable train stops at the general order limits after observing what appears to be the first train rerouted as per the general order service plan. This method of securing general orders does not provide a positive confirmation that RTO has surrendered the track and allows for a great margin of error.

E. <u>Rapid Transit Operations:</u>

T/O Pouncy operating the 22:51 #3 train provided the following account of the incident. T/O Pouncy stated that due to scheduled train service plans, the train he was operating was crossed from the southbound express to the southbound local track at 96th Street and he anticipated being crossed back to the express track north of Chambers Street. However, upon his arrival at 79th Street station, T/O Pouncy was informed that there was a train with a problem at 66th Street, therefore he was rerouted back to Track 2 north of 72nd Street and proceeded into 72nd Street station.

T/O Pouncy reported that prior to leaving 72nd Street station; the RCC informed him that there was going to be personnel on the tracks investigating a BIE at 66th Street. T/O Pouncy stated that from the time he was north of 66th Street until he was north of 59th Street, he sounded his horn approximately every 100 feet and was operating at a speed of 10 miles per hour. T/O Pouncy stated he continued to maintain this speed due to banks of lights illuminated in the area and common sense dictated that he proceed with caution. T/O Pouncy stated that a track worker walked in front of his train with his back toward the train. T/O Pouncy saw the track worker's head turn toward Track 3, as if someone said something to him. The TWU BOI member does not agree and asserts that T/W Boggs was probably looking for a reverse move by the work train as he believed the G.O. was in effect. T/O Pouncy first observed T/W Boggs walk onto Track 2 from a distance of 5 to 8 feet. T/O Pouncy was utilizing the train brake at the time and upon observing the track worker, he placed the train into emergency. However, this action did not prevent his train from striking T/W Boggs. T/O Pouncy then notified the RCC and the conductor aboard his train of the incident.

Based upon the statements provided by T/W Denton that T/W Boggs was struck almost immediately upon entering Track 2 and the statement of T/O Pouncy that he placed his train into emergency after he observed T/W Boggs to be 5-8 feet in advance of his train, combined with the physical evidence observed at the incident site it would appear that the total distance traveled by the train from the time that T/O Pouncy requested an emergency brake application, to the time the train came to a rest was approximately 105 feet, 8-1/2 inches. This distance is the sum measurements at which T/O Pouncy observed T/W Boggs using the greater distance of 8 feet, the 39 feet that T/W Boggs' body was propelled south and the additional 1-1/3 car length (58 feet, 8-1/2 inches) further south that the 22:51 #3 train traveled beyond T/W Boggs' final resting position before the train

came to a stop. The DCE "Speed Distance Chart" reflects a typical train traveling at 18.50 mph should come to a full stop in 105.57 feet. In addition, based upon the results of Run 3 performed during the emergency brake stopping test, which reflects this specific consist stopped at 104 feet, while traveling at a speed of 20 mph. it is most probable that T/O Pouncy was operating at approximately 18 to 20 mph when he requested the emergency brake application.

A review of hours that T/O Pouncy worked on the day of the incident and the last 7 days did not reveal any hours of service violations.

F. Division of Car Equipment

The train involved in the accident consisted of 10 R-62 cars (Consist S/M: 1550-1549-1548-1547-1546-1505-1504-1503-1502-1501). They were built in 1984 by the Kawasaki Corporation. Each car weighs an average of 76,000 lbs. and is 51 feet ½ inch in length. The Division of Car Equipment (DCE) inspected the train at the site and reported the horn and wiper were operative on car 1550. In addition, the windshield was clean and the sealed beams were on.

At the request of RTO, DCE personnel were dispatched to check this train's leader, which was W/T 2A to determine if there was any evidence that W/T 2A came in contact with T/W Boggs. The Road Car Inspector (RCI) on duty at Times Square inspected all tripping devices on the consist and found no strike marks and all the snow blocks were in place. The RCI found no evidence that W/T 2A came in contact with the injured employee.

The car case maintenance history records for the 10 cars involved in the incident were reviewed for the period of April 4, 2006 through April 25, 2007. The records indicated that all cars completed Scheduled Maintenance (SM) Type 1, 2, 3 and 4 Inspections at the Livonia Maintenance Facility during this period of time. SM inspections of all cars revealed that there were no defects found with propulsion or brake system components.

A review of the car case maintenance histories also revealed that the brake and associated components for the 5 south cars of the 10 car consist, (1550-1549-1548-1547-1546) were all cycled through the Scheduled Maintenance System (SMS) on December 4, 2006 at the American Association of Railroads (AAR) certified Coney Island Pneumatic Facility. The SMS procedure requires the overhaul of the sub-components of the R-62 car E-2 air brake operating unit, including FA-4 Application and Release Valve, Emergency Vent Valve, J Relay, Check Valve, Variable Load Valve and Load Sensor Valve.

On May 4, 2007, brake and stopping distance tests of the car equipment involved in the accident was conducted on the Culver Line between Ditmas Avenue and Kings Highway on Track B3/B4. The results indicate that the brake and propulsion systems were operating satisfactorily. The results of the emergency brake stopping distances were as follows:

RUN	SPEED	STOP DISTANCE	REQUIRED DISTANCE	PASS/FAIL
Calibration.	30 mph	221 feet	250 feet	Pass
1.	30.1 mph	223 feet	250 feet	Pass
2.	25.4 mph	156 feet	180 feet	Pass
3.	20 mph	104 feet	121 feet	Pass

4.	15.2 mph	63 feet	74 feet	Pass
5.	10.1 mph	32 feet	38 feet	Pass
6.	5 mph	12 feet	13 feet	Pass

G. Electronic Maintenance Division

The New York City Transit rule book entitled "Rules and Regulations Governing Employees of MTA New York City Transit, Manhattan and Bronx Surface Transit Operating Authority and South Brooklyn Railway, Rule 22(a) states, "Emergency Alarm System equipment has been installed throughout the Rapid Transit System to provide a means whereby power can be removed from the contact rail in cases of emergency by the operation of an Emergency Alarm Box. The location of every such box on the trackways is indicated by a Blue Light." In addition, Rule 22 (c) states in part, "Any employee discovering a condition requiring the immediate removal of power must proceed at once to the nearest Emergency Alarm Box and operate same according to instructions." Employees performing duties on the Right of Way have an expectation that when an EA box is activated, third rail power will be removed. At the time of this incident, EA box 2124 located on Track 1 north of 59th Street was not functioning as intended and when M/S II Hall activated the lever, third rail power was not removed.

The Electronic Maintenance Division (EMD) is responsible for the inspection and testing of Emergency Alarm (EA) boxes and Emergency Telephones (ET) at Blue Light locations. As part of the Board of Inquiry, the malfunction of the EA box during this incident was investigated. Records indicate that on June 13, 2006, EMD personnel identified a problem with cable L36 that controls EA boxes 2122 through 2127 that covers the geographic area north of 50th Street to south of 66th Street on the 7th Avenue line. EMD stated that although cable L36 showed a partial ground, EA boxes 2122 through 2127 were still operational at that time. EMD generated Trouble Ticket #104839 indicating that L36 cable had a 48 volt ground condition. As a result of generating this ticket, additional personnel were dispatched on June 14, 2006 to test the cable. The cable field test report for this date indicates that cable L36 is a 12 pair cable and was found to have stray voltage on wire pairs 1, 2, 3, 9, 10, and 11 indicating non functioning circuits. On June 15, 2006 EMD notified the Power Department-Maintenance Cable Repair Section (MCRS) of the condition and requested their assistance in addressing the problem.

Cable L36 was added to the EMD/Power Communication List on June 21, 2006. Once a cable is added to the EMD/Power Communication List it is assigned a priority number. The lower the assigned number; the higher the priority, i.e., a defective cable designated as #1 is considered the highest priority. The practice followed by EMD to prioritize defective cables on the communication cable list is not a formal procedure. The decision making process is driven by factors such as impact to safety, the size (number of conductors) contained within a cable, availability of remaining circuits within the defective cable, the ability to route the cable, availability of personnel, scheduling of General Orders, flagging arrangements and the ability to implement repairs in accordance with approved NYCT policies.

EMD provided OSS with a copy of the communication cable list dated June 27, 2006 which indicates that cable L36 was designated as priority #13 of 95 defective cables. On August 16, 2006, cable L36 was reassigned to priority #24 of 109 defective cables and the status of cable L36 was listed as "in progress". On January 17, 2007, cable L36 was given priority #28 of 117 defective

cables and was again listed as "in progress". Discussion with MCRS personnel revealed that although EMD listed cable L36 as "in progress" no work had been performed to affect repairs to the cable. The only explanation that OSS was able to find as why cable L36 was listed as "in progress," is that cables L35 and L36 are physically hard wired together in a telephone terminal box creating a continuous run between the two cables. Therefore, any grounds on cable L35 will negatively influence the operation of cable L36. MCRS personnel had performed remedial work in an attempt to repair cable L35. Therefore, it is plausible that EMD assumed that correcting the problem on L35 would also reduce or eliminate the problems with cable L36.

A defective communication cable list dated April 27, 2007 was provided to the Board of Inquiry during the session on May 1, 2007. The list reflected that cable L36 had been moved to priority #77 and was still "in progress." It should be noted that cable L35 was listed as priority #76 on the same list. In subsequent discussions with EMD senior management, OSS was informed that the significant priority change in the status of L36 cable was due to EMD's attempt to group cables together according to geographic areas in order to more efficiently address the defective cable problem. Although the cable list reflected that the work was "in progress" cable L36 had been on the list for 310 days and cable L35 had been on the list for 598 days. The communication cable list reflects additional cables that have been on the list for prolonged periods of time.

EMD provided OSS with a copy of Trouble Ticket #117561, which was generated after the EA boxes in the area of 59th Street were inspected on April 10, 2007. Trouble Ticket #117561 indicates that EA boxes 2122 through 2127 had no EA code, which means the boxes were non operational at that time. Trouble Ticket 117561 was considered "void" because Trouble Ticket #104839 was still active and EMD had already identified cable L36 as the source of the malfunction. There does not appear to be any indication that EMD personnel reclassified cable L36 to give the problem a higher priority even though the condition of cable L36 had further degraded and the EA boxes were now inoperable.

In addition, EMD personnel stated that although the EA boxes were found to be not working, they do not "bag" or otherwise display any type of identifying markings on the boxes that would alert employees that the EA boxes will not remove power if activated. The only time that an EA box is bagged, is if it has not been turned over by a contractor and is out of service. EMD also stated that they do not bag EA boxes that are not operating due to grounded cables, because the operation of the EA box can be influenced by environmental factors such as rain. EMD stated that it is possible that an intermittent problem caused for example by water intrusion can affect the operation of an EA box. Therefore EMD's practice was not to "bag" the non operating boxes, because they could potentially work in the event that favorable environmental conditions, such as dry weather, which could reduce a ground condition allowing the box to function in an emergency.

MTA Audit Services (MTA AS) performed an Emergency Alarm Box Review to identify deficiencies in the current inspection and maintenance practices associated with EA boxes. On June 25, 2007 MTA AS issued their findings. The MTA AS concluded that the estimated failure rate of emergency alarms is 2.8%. In addition, EMD did not track Emergency Alarm outages on a daily basis, EMD had not established standards for corrective actions when failures occurred and inspections were not completed timely for 2007. Based upon their review, MTA AS issued the following five recommendations:

- EMD establish standards for reporting of, and responding to Emergency Alarm failures. The standards should:
  - Include what constitutes a critical failure such as is used with the DT with Red conditions.
  - Indicate how quickly defects should be corrected, considering the nature of the defect, the location, and the number of boxes impacted.
  - Include the status of the emergency telephones.
- EMD should track the failure rate using the new daily outage report.
- The EA/ET outage report should include:
  - The cause of the Emergency Alarm failure.
  - Status of corrective action.
  - Compliance with established standards.
  - Identification of all Emergency Alarms impacted by a device.
- EMD should ensure that all inspections are completed as required:
  - All EAs and ETs are inspected January to May.
  - Emergency Telephones should be inspected again June through August.
  - EAs in under river tubes should be inspected a second time from September to December.
- EMD should report on compliance with inspections goals on a monthly basis.

H. Department of Subways Capital Programs:

OSS contacted Capital Programs (CP) personnel to determine if there are any ongoing or upcoming projects that address EA problems specifically and system wide cable problems in general. CP personnel provided documents that reflects a Project Master Plan was approved on November 9, 2004 to address copper cable replacement under the title, "Copper Cable Replacement: Consolidating and Upgrading Copper because of SONET", Planning number: MW17-6671, PSE #W32673. The Executive Summary, (b). Description of Proposed Work/Procurement, states in part, "This initiative is a request to encumber funding in order to replace the copper cable that is in poor condition with new copper cable. The new cable installation strategy will be developed in accordance with Transit's Telecommunication specifications. This will include performing site surveys to determine condition of the cable and to identify the amount of cable that will need to be replaced at each location, with special attention to the remaining lead cable, as it is unreliable and obsolete. The replacement of the copper cable will done in several phases beginning in 2008. These copper cables are main cables and tail cables that serve Fan Plants, Pump Rooms, Machinery Rooms and Emergency Alarm Units/Emergency Telephones along the Right of Way".

The objective of the proposed project is to replace approximately 100 miles of copper cable along the Right of Way. In the Capital Program 2005-2009, 5 miles of copper cable is anticipated to be addressed with an available budget $8.58 million. The "Alternative Analysis" section of this document reflects, "The only viable alternative is to replace the copper cable that is now in poor condition with new cable. Much of the existing copper cable has been in place for many years and has degraded to the point that performance and connection service to key core systems is being impacted."

CP also initiated a project PSE Number S32184, which was to replace Emergency Alarm phones system wide with new technology (IP) phones. However, the pilot program for this project failed.

The Design Manager of the project wrote a memorandum dated December 26, 2006 to the Program Officer, which states in part, "Although Capital Program Management (CPM) has not received a formal evaluation report from the DOS on the pilot; the results shared with us indicate conclusively that our existing copper infrastructure cannot support these new technology (IP) telephones." In light of this fact, the program is currently being reworked.

I. Power Department- Maintenance Cable Repair Section:

The MCRS serves end-users from a variety of departments including but not limited to CPM, EMD, and S/O. The priority of repairing defective cables is established by the end users for their respective departments and this information is conveyed to the MCRS group. Once the MCRS receives the defective cable priority list from these departments, MCRS bases their decisions for performing corrective actions on the urgency and/or emergency of repairs expressed by the end users. The MCRS serves a global community of end users that have competing needs.

In subsequent discussions with MCRS management regarding the resolution of outstanding defective cable complaints, it was determined that MCRS does not appear to have a comprehensive list of all outstanding end user defective cables. MCRS did not have a work order generated for cable L36 because the priority of the cable was low on the end users list. Therefore, many cables that are used to perform safety critical functions can remain unaddressed for a prolonged period of time. The attention of MCRS personnel is focused on resolving the most serious problems based on end user complaints. The MCRS needs to establish the entire number of outstanding defective cables that exist for all end users.

The present staffing level including all reimbursable and non reimbursable heads is 182 people. These individuals are broken down by the following titles: 5 Managers, 3 M/S IIs, 30 M/S Is, 94 Maintainers, 47 helpers, 2 Apprentices and 1 Associate Transit Management Analyst. The MCRS presently has 860 outstanding work orders to repair defective cable. There are additional defective cables have been identified but have not yet been entered into the MCRS work order system. Therefore the 860 outstanding work orders do not represent the total number of outstanding defective cables that are awaiting repair.

J. Interagency Emergency Response:

NYPD, FDNY and EMS personnel were notified of the incident and responded to the scene. Upon their arrival, FDNY personnel entered the tracks in an attempt to render immediate assistance to T/W Boggs. The third rail power on Tracks 1, 3, and 4 was still alive at the time. The NYCT Policy Program Manual, Procedures for Responses to Rapid Transit Emergencies 10.32.3, Section Q. Power Removal/Restoration Procedures states in part, "The **FDNY regulations prohibit their personnel from operating on electrified railroad tracks while power remains on**, unless human lives are in imminent peril and direct and immediate action is required to save lives. The FDNY determined that T/W Boggs was deceased and his body was eventually placed in body bag and relocated to the northbound local platform. The coordination of the emergency response between personnel from the FDNY and NYCT was reviewed. OSS determined that the required interagency protocols were followed.

K. Rules & Regulations

Listed below are pertinent rules that apply to this accident. The rules were obtained from the New York City Transit rule book entitled "Rules and Regulations Governing Employees of MTA New York City Transit, Manhattan and Bronx Surface Transit Operating Authority and South Brooklyn Railway" revised and the "Safety Rules and Regulations for Maintenance of Way" dated 2003.

Rules and Regulations Governing Employees of MTA New York City Transit, Manhattan and Bronx Surface Transit Operating Authority and South Brooklyn Railway

Certain Acts of Employees Prohibited

Rule 11: (s) Employees must expect trains to run at any time on any track in either direction. Employees must be conversant with all applicable General Orders. They must look in each direction before entering upon or standing close to any track and must be particularly careful not to touch the contact rail, side approach plates, or fixtures extending from and fastened to the side approach.

Employees Entering Upon the Track

3.71(c) (formerly 82c) Before entering upon any track or onto any trackway, each employee must first listen and look in each direction for trains. They must learn the direction of normal traffic on the track and must walk AGAINST the current of traffic when possible.

3.71 (e) (formerly 82e) Employees are particularly cautioned with reference to sections of track on which regular operation may at times not be scheduled that such tracks are likely to be used at any time by special trains, work trains, etc.

At no time must any section of track be assumed to be out of service. Employees must not make any assumptions as to operating schedules.

3.71(i) (formerly 82h) Employees walking on tracks or adjacent to tracks must, when a train approaches, move into the clear and stand in a safe location, give the Train Operator a proceed signal to assure said operator they are aware of the approaching train and remain in such position until the train has passed.

Flagging Responsibilities

3.72(b) (formerly 71b) Before a gang or group goes to work under full flagging or General Order protection at a given location, the Control Center Desk Superintendent must be notified.
Note: A designated employee makes the notification call for the gang or group.

Lights, Flags, Required Equipment and Procedure

The required procedure must be as follows:

3.77(a) (formerly 79c1, 75a-b) On any track where lights or flags are displayed the flagger along with another qualified flagger places the green lights or flags at their fixed position:

In order to provide clarification of the context of the above rule it should be noted that the intent of this rule is to signify that the green flag/lamp is first lamp displayed when establishing flagging, followed by the yellow flags/lamps.

Safety Rules and Regulations for Maintenance of Way

17.04 In order to detect approaching trains, be alert to visible signs, sounds, and wind pressure in both directions before crossing tracks.

17.07 Do not assume any section of track is out of service. Expect trains to run at any time, on any track and in any direction.

17.10 When walking on the track and there is evidence of a train in the vicinity, stop and step into a safe location until it is safe to resume walking.

L. Service Record

Track Worker Daniel Boggs was appointed to his position on August 24, 1992. A review of his disciplinary action history revealed no infractions.

T/O David Pouncy Jr. was originally hired by MTA New York City Transit on January 9, 1989 in the title of Track Worker. He was promoted to the title of T/O on November 30, 1997. The BOI determined that no information in the service record was relevant to this incident.

M/S II Curtis Hall was originally hired by MTA New York City Transit on March 18, 1985 in the title of Track Worker. On January 12, 1992 he was promoted to the title of Track Worker (Specialist). He was promoted again on November 14, 1993 to the title of M/S I. M/S II Hall was promoted to Maintenance Supervisor Level II on August 18, 1997. On March 21, 2001 Mr. Hall was demoted to M/S I as a result of disciplinary action. He was reinstated to M/S II on December 16, 2001. The BOI determined that no information in the service record was relevant to this incident.

M. Training & Evaluations

Currently, NYCT employees must complete a one day Track Safety training course to be permitted to enter upon the trackway. Refresher training is required every three years and is fulfilled through the use of the track safety and flagging video. The current video is entitled "Anatomy of an Incident." The practice in MOW is to view this video annually during the Safety Stand Down Seminar. MOW flaggers are qualified through the 2 day Standard Flagging course. There is no refresher other than the aforementioned video.

Track Worker Boggs' training records indicate he received basic Track Worker and flagging training in August of 1992. Between August, 1992 and March, 2007 Mr. Boggs attended a variety of safety training courses including but not limited to Right to Know, Infectious Waste, and Hearing Conservation. In addition, Mr. Boggs received training in work related tasks including but not limited to Respirator Training, Asbestos Awareness and Occupational Lead Exposure. Mr. Boggs last attended a Safety Stand Down Seminar on December 14, 2006, where he received track safety and flagging refresher training.

M/S II Hall's training records indicate that he completed flagging training on March 29, 1985. In October of 1988, he received Track Walker field training. Between October 1988 and May 2007 Mr. Hall attended a variety of safety training courses including but not limited to Right to Know, Infectious Waste, and Hearing Conservation. In addition, M/S II Hall received training in work related tasks including but not limited to Crane Operator Refresher and Occupational Lead Exposure. Additionally, he received CBTC Flagging Awareness in September of 2005. M/S II Hall last attended a Safety Stand Down Seminar on December 28, 2006.

T/O Pouncy was critiqued between the dates of April 26, 2006 to April 21, 2007 on aspects of train operation including but not limited to collisions/derailments and switch run through by his assigned Train Service Supervisor (TSS) Josephine Carthon. He received a rating of "good" in all areas. In addition, information obtained from RTO Technical Standards and Procedures indicated that T/O Pouncy was qualified to operate R62A type equipment.

Train Operators are required to receive refresher training every three years. A review of T/O Pouncy's training history revealed that he last attended Train Operator Simulator training on December 3, 2001 and completed the class the following day on December 4, 2001. As part of this refresher training, T/Os attend Fire and Evacuation school, which T/O Pouncy attended on February 6, 2002. T/O Pouncy also attended train operator reinstruction class on February 4, 2003, because the employee had a prolonged absence due to a service connected injury. However, this class does not meet the requirements of the three year refresher curriculum. Therefore T/O Pouncy records reflect that last time he received the required three year refresher training was in December of 2001.

N. Medical

In 1998, a policy change was implemented regarding the medical assessment policy. The policy change reduced the number of employee titles that OHS routinely surveils to four. These titles are Train Operator, Bus Operator, Conductor and Tower Operator. Therefore based upon the policy change T/W Boggs would not have been surveiled by OHS on a routine basis.

Michelle Alexander, M.D., Assistant Vice President of Occupational Health Services (OHS) testified that T/W Boggs received his last true complete medical examination by OHS personnel on July 20, 2000. His visual acuity was within normal limits. T/W Boggs color exam was normal and his peripheral vision and depth perception were normal. The results of the physical were unremarkable, subsequently, T/W Boggs was returned to full duty. The only other history that OHS has pertaining to T/W Boggs was a hearing conservation screening test done in March of 2007 and the results of that test was normal.

In addition, Doctor Alexander testified that T/O Pouncy received a medical examination on April 25, 2007 following the incident. Findings of his examination including vision were normal and he was given a status of full duty.

The last time T/O Pouncy was seen by OHS prior to the incident was September 26, 2006. This physical exam found everything to be normal and he was returned to full duty.

O. Post Incident Testing

Following the incident RTO management requested that T/O Pouncy and Conductor (C/R) C. Williams have drug and alcohol screening testing performed by OHS personnel at St. Vincent's hospital where they were being treated for post incident trauma. The OHS lab technician responded to the scene and administered the required post incident testing. The results of the tests were negative for both employees.

P. Autopsy Report

On May 7, 2007, the Director of Public Affairs for the Medical Examiners Office was contacted by OSS with regard to this incident. The Director of Public Affairs stated that the cause of death of T/W Boggs was found to be blunt impact trauma to the head, torso and extremities as a result of accidental contact with a train. When asked about possible electrocution, the Director of Public Affairs stated that electrocution was not a factor in this accidental death.

On July 6, 2007, the Medical Examiners Office issued their Report of Autopsy indicating that the cause of death for T/W Boggs was blunt impact trauma of head, torso and extremities. The result of the toxicology tests performed were negative with the exception of nicotine.

II. BOARD OF INQUIRY INVESTIGATION

A. Sequence of Events

Based on the factual information compiled during the investigation and testimony provided by the witnesses, the Board determined that the following sequence of events was most likely:

- At 22:00 hours on April 24, 2007, a group of T/Ws reported for duty at 50th Street and 6th Avenue DT quarters. M/S II Hall gave the T/Ws a tool box safety talk, discussed the Rule of the Day, and gave the employees a pre-job meeting, which outlined the work that would be performed. The gang of T/Ws was assigned to perform rail renewal on Track 2 adjacent to the 59th Street station on the 7th Avenue Line. This work was to be performed during G.O. 1409-07 that was scheduled to start at 23:00 hours.

- Six members of the gang were assigned to perform flagging activities. The T/Ws were divided into three teams of two persons. M/S I Larrier dispatched one team to secure the northern limits of G.O 1409-07 with red flagging lamps and a portable train stop. M/S Larrier also dispatched a second team to perform a similar function at the southern limits of G.O. 1409-07. The protocol used by DT personnel to secure general order limits does not require verification from RTO that the track has been surrendered.

- M/S II Hall assigned the third team consisting of T/W Boggs and T/W Denton to display adjacent track flagging on Track 1 and Track 4 north of 59th Street station in anticipation of performing rail renewal activities at the commencement of G.O. 1409-07.

- M/S II Hall did not call the RCC to inform them that he was entering the track to establish adjacent track flagging at 59th Street.

- In addition, M/S II Hall instructed T/W Boggs and T/W Denton to first install the 3 yellow lamps on Track 1. The correct sequence is to display the green lamp first.

- In order to carry out these instructions T/W Boggs and T/W Denton crossed the two express tracks to place the green lamp on Track 4. Additionally, by selecting this route, they would be crossing the express tracks again to return to the platform at 59th Street to retrieve additional lamps for the opposite end of the work area. The supervisor in charge of the work is responsible to identify the safest route possible for workers to use when performing their duties.

- As the T/Ws were in the process of displaying adjacent track flagging, W/T 2A passed their position.

- W/T 2A was assigned to support track construction activities performed during the general order operation and under normal circumstances G.O 1409-07 should have went into effect at 23:00 hours. However, at 23:00 hours, the 22:28 #1 train out of 242nd Street experienced a Brakes in Emergency (BIE) at 66th Street on Track 1, therefore, the implementation of G.O. 1409-07 was delayed and southbound revenue service was rerouted to Track 2.

- T/O Lewis, who was performing the flagging functions on board the south end of W/T 2A, stated that W/T 2A stopped abreast of the 59th Street station at which time he informed M/S II Hall that there was some type of problem on the local track and the southbound service may be continuing on the express track.

- M/S II Hall gave a conflicting version of this conversation, stating that he was informed by T/O Lewis that W/T 2A was being sent to Chambers Street.

- M/S II Hall proceeded to the north end of the southbound platform at 59th Street and descended the platform ladder to Track 1. M/S II Hall stated that his intention was to turn on the temporary lighting at the work area to illuminate the tracks where T/W Boggs and T/W Denton were setting up adjacent track flagging in order to provide them with greater visibility.

- M/S II Hall proceeded to a column adjacent to the north end of the southbound platform located between Track 1 and Track 2 where the switch was mounted. M/S II Hall activated the switch, turning on the temporary lighting used for illuminating the work area. The temporary lighting at this location is powered by the third rail in the area.

- At approximately 23:20 hours, T/W Boggs and T/W Denton reversed their direction of travel and were returning to the 59th Street southbound local platform to retrieve additional lamps to display adjacent track flagging at the opposite end of the work area, which would have been at the south end of 59th Street station on Track 1 and Track 4. The employees began walking from east to west with T/W Boggs in the lead and T/W Denton trailing a few feet behind him. T/W Boggs stepped from Track 3 onto Track 2 and was struck by the 22:51 #3 train out of 148th Street, which resulted in T/W Boggs sustaining a fatal injury.

- T/O Pouncy operating the 22:51 #3 train, stated that after passing 66th Street at a speed of 10 mph, he continued to maintain this speed due to banks of lights illuminated in the area and common sense dictated that he proceed with caution. T/O Pouncy stated that a track worker walked in front of his train with his back toward the train. The TWU BOI member asserts that T/W Boggs was probably looking for a reverse move by the work train as he believed the G.O. was in effect. T/O Pouncy saw the track worker's head turn toward Track 3, as if someone said something to him. T/O Pouncy estimated that there was only a distance of approximately 5 to 8 feet between them. T/O Pouncy was utilizing the train brake at the time and upon observing the track worker, he placed the train into emergency. However, this action did not prevent his train from striking T/W Boggs. T/O Pouncy then notified the RCC and the conductor aboard his train of the incident.

- M/S II Hall heard T/W Denton shouting, "Boggs got hit," "Boggs got hit" and responded to the incident area. M/S II Hall observed the train shoe of the first south truck of the second car in contact with T/W Boggs' body.

- M/S II Hall went to EA box 2124 at the north end of 59th Street station on Track 4 and attempted to remove third rail power by pulling down the lever. M/S II Hall recognized that his attempt to remove the third rail power was unsuccessful due to the fact that temporary lights that are powered by the third rail remained illuminated.

- The EA box was not functioning as intended and did not remove third rail power.

- EMD records indicate that on June 13, 2006, EMD personnel identified a problem with cable L36 that controls EA boxes 2122 through 2127 that covers the geographic area north of 50th Street to south of 66th Street on the 7th Avenue line. EMD stated that although cable L36 showed a partial ground, EA boxes 2122 through 2127 were still operational at that time.

- EMD generated Trouble Ticket #104839 indicating that L36 cable had a 48 volt ground condition. As a result of generating this ticket, additional personnel were dispatched on June 14, 2006 to test the cable. The cable field test report for this date indicates that L36 is a 12 pair cable and was found to have stray voltage on wire pairs 1, 2, 3, 9, 10, and 11 indicating non functioning circuits. On June 15, 2006 EMD notified MCRS of the condition and requested their assistance in addressing the problem.

- Cable L36 was added to the EMD/Power Communication List on June 21, 2006. EMD provided OSS with a copy of the communication cable list dated June 27, 2006 which indicates that cable L36 was designated as priority #13 of 95 defective cables. On August 16, 2006, L36 was reassigned to priority #24 of 109 defective cables and the status of cable L36 was listed as "in progress." On January 17, 2007, cable L36 was given priority #28 of 117 defective cables and was again listed as "in progress." The cable list provided during the Board of Inquiry session on May 1, 2007, reflected that cable L36 had been moved to priority #77 and was still "in progress". Cable L36 had been on the defective cable list for greater then 300 days when this incident occurred. The communication cable list reflects additional cables that have been on the list for prolonged periods of time.

- EMD provided OSS with a copy of Trouble Ticket #117561, which was generated after the EA boxes in the area of 59th Street were inspected on April 10, 2007. Trouble Ticket #117561 indicates that EA boxes 2122 through 2127 had no EA code, which means the boxes were non operational at that time. Trouble Ticket 117561 was considered "void" because Trouble Ticket #104839 was still active and EMD had already identified cable L36 as the source of the malfunction.

- In addition, EMD personnel stated that although the EA boxes were found to be not working, they do not "bag" or otherwise display any type of identifying markings on the boxes that would alert employees that the EA boxes will not remove power if activated.

- The RTO radio transmission of the time that T/O Pouncy reported the incident is time stamped as 23:19:53 hours. D/S Allen located at the RCC was contacted via telephone by DT M/S I Larrier who was also at 59th Street during the incident. M/S I Larrier requested the removal of third rail power at 23:21 hours. D/S Allen contacted the S/O and coordinated the third rail power removal operation. D/S Allen reported that power was removed on Track 2 at 23:24 hours. In addition power was removed on Track 1 at 23:39, Track 3 at 23:35 and Track 4 at 23:35 respectively.

- A review of the S/O Operation Log confirms D/S Allen's account of times that power was removed, however the S/O log showed power off on Track 1 as 23:38, which is a minor discrepancy of one minute earlier when compared to the RCC records.

- NYPD, FDNY and EMS personnel were notified of the incident and responded to the scene. Upon their arrival, FDNY personnel entered the tracks in an attempt to render immediate assistance to T/W Boggs. The third rail power on Tracks 1, 3, and 4 was still alive at the time. The FDNY determined that T/W Boggs was deceased and his body was eventually placed in a body bag and relocated to the northbound local platform.

- CPM personnel initiated a program to install new technology phones at EA locations, however due to the poor condition of copper cable system wide; the cabling infrastructure can not support the scope of this work. This problem is being reviewed and a scope of work to address this issue is being reworked.

III. CONCLUSIONS

After reviewing the facts and circumstances of this accident, the Board of Inquiry has concluded the following:

- The protocol used by DT personnel to secure general order limits does not require the verification that RTO has surrendered the track. DT M/S I Larrier reported that T/Ws will install the red lamps and portable train stops at the general order limits after observing what appears to be the first train rerouted as per the general order service plan. This method of securing general orders allows for a great margin of error. The DT must verify RTO has relinquished a track before the DT installs red lamps and a portable train stop.

- M/S II Hall did not notify the RCC before sending employees to establish adjacent track flagging. Under the existing DT practices, the perception among DT management is that an additional phone call is not required to establish adjacent track flagging while working under a G.O. This practice does not conform to Rule 3.72(b).

- Had M/S II Hall called the RCC there may have been opportunity for him to be advised that due to the train with brakes in emergency at 66th Street, the implementation G.O. 1409-07 would be delayed and that train service would be continuing on Track 2. Assuming M/S II Hall received this information, he could have then conveyed it to the employees prior to sending them on the tracks to establish flagging.

- There is presently no requirement that employees be granted permission by the RCC before accessing the Right of Way. As written, the rule only requires that the RCC be notified by employees before establishing flagging. There should be one definitive authority in granting track access. Therefore, the RCC should be given the authority to grant or refuse track access to employees working on or adjacent to the Right of Way.

- As Track Supervisors are not normally issued radios, M/S II Hall did not have a radio with which he would have been able to monitor radio transmissions in the area that may have alerted him to the train that was brakes in emergency at 66th Street as well as the service diversion that rerouted trains back on to Track 2. In addition, when M/S II Hall's attempt to remove power was unsuccessful, he reported that he could not contact the RCC via the telephone due to receiving a busy signal. M/S II Hall being in possession of a radio would have expedited communication with the RCC in regard to requesting power off.

- The population of employees that are issued radios does not encompass all personnel who supervise and/or perform activities on the Right of Way. Personnel performing work on or adjacent to the Right of Way should have the ability to monitor radio transmissions for service disruption or emergencies that could impact their operations as well as to have the ability to report unsafe conditions or request assistance in the event of an injury. Therefore, the DOS should review the current titles and task that are performed on the Right of Way and issue radios to the appropriate personnel.

- M/S II Hall also did not provide proper instruction to the employees establishing flagging. He instructed the employees to display the lamps in the wrong sequential order. M/S II Hall instructed to T/W Boggs and T/W Denton to first install the 3 yellow lamps on Track 1. The correct sequence is to display the green lamp first. However, of greater significance is the fact that in order to carry out these instructions T/W Boggs and T/W Denton crossed the two express tracks to place the green lamp on Track 4. Additionally, by selecting this route they would have to cross the express tracks again to return to the platform at 59th Street to retrieve additional lamps for the opposite end of the work area. The supervisor in charge of the work is responsible to identify the safest route possible for workers to use when performing their duties. M/S II Hall who was in charge of coordinating the adjacent track flagging activities as well as coordinating the work to be performed by the gang did not adequately provide a safe work environment for the employees directly under his

supervision and did not follow established flagging procedures. The TWU BOI member asserts that the order that the flagging was established was not significant to this event.

- The testimony of T/W Emory and M/S I Larrier appears to substantiate T/O Lewis' testimony of the conversation between T/O Lewis and M/S II Hall in which they discussed the possibility of additional train service operating on Track 2. At the time the conversation occurred, T/W Boggs and T/W Denton were most probably already engaged in establishing flagging and without radios, this information could not be immediately and effectively communicated to them. The TWU Board member believes that once M/S II Hall became aware that additional train service may be operating on Track 2, M/S II Hall could have made an attempt to caution approaching trains on Track 2. The entire BOI is not certain that sufficient time was available for M/S II Hall to have reached a position on Track 2, that would have altered the outcome of this event.

- T/W Boggs most probably shared the same belief as T/W Denton that G.O 1409-07 was in effect on Track 2. W/T 2A passing his location as he and T/W Denton were establishing adjacent track flagging protection may have contributed to this belief. In addition, M/S II Hall stated that he turned on the temporary lighting to increase visibility for the T/Ws. The act of illuminating the work area may have also reinforced T/W Boggs belief that G.O. 1409-07 was in effect by providing a visual cue that work in the area was about to commence. Therefore, T/W Boggs may have been of the belief that no additional revenue trains would be operating on Track 2.

- T/W Boggs walked east to west from Track 3 and stepped onto Track 2 without first looking in both directions for approaching trains and was struck by the 22:51 #3 train out of 148th Street. In doing so, he violated a number of NYC Transit rules and regulations. T/O Pouncy indicated he saw the track worker's head turn toward Track 3, as if someone said something to him. The TWU BOI member does not agree and asserts that T/W Boggs was probably looking for a reverse move by the work train as he believed the G.O. was in effect. Therefore, this action exhibits that T/W Boggs was being alert.

- The results of analyzing the facts of the case indicate that T/O Pouncy was traveling at an approximate speed of 18-20 mph when he made contact with T/W Boggs. Given the fact that T/O Pouncy had passed the incident area at 66th Street with regard to the BIE on the local track and the fact that there was no flagging protection established on Track 2, T/O Pouncy was operating at a reduced rate of speed for that area. T/O Pouncy was found to have no culpability in this event.

- M/S II Hall went to EA box 2124 at the north end of 59th Street station on Track 4 and attempted to remove third rail power by pulling down the lever. The EA boxes 2122 through 2127 covering the area north of 50th Street to south of 66th Street were not working.

- The RTO radio transmission of the time that T/O Pouncy reported the incident is time stamped as 23:19:53 hours. M/S I Larrier made a phone call from the token booth to request power off at 23:21 hours. D/S Allen contacted the S/O and coordinated the third rail power removal operation. D/S Allen reported that power was removed on Track 2 at 23:24 hours.

Therefore the amount of time that was consumed from the start of the incident, to the time power was removed on Track 2 was approximately 4 minutes.

- There does not appear to be any indication that EMD personnel reclassified cable L36 to give the problem a higher priority even though the condition of cable L36 had further degraded since the previous inspection performed on June 13, 2006 and the EA boxes were now inoperable as of April 10, 2007. Emergency equipment should be given the highest priority for repair when identified as non operational.

- Although the EA boxes were found to be not working, EMD did not "bag" or otherwise display any type of identifying markings on the boxes that would alert employees that the EA boxes will not remove power if activated. EMD's practice was not to "bag" the non operating boxes, because they could potentially work in the event that favorable environmental conditions, such as dry weather, which could reduce a ground condition allowing the box to function in an emergency. This practice has been abolished and the error in decision making is made on the side of caution and now requires "bagging" non operating EA boxes to alert employees of their status.

- MTA AS performed an Emergency Alarm Box Review to identify deficiencies in the current inspection and maintenance practices associated with EA boxes. MTA AS concluded that the estimated failure rate of emergency alarms is 2.8%. In addition, EMD did not track Emergency Alarm outages on a daily basis, EMD had not established standards for corrective actions when failures occurred and inspections were not completed timely for 2007. Based upon their review, MTA AS issued five recommendations to EMD.

- Additionally, at the time of this incident, no formal procedure existed with regard to working in an area where the EA box/ ET is non operational and no procedure existed that conveyed the status of non-operating ET/EA devices to employee working in an area.

- In subsequent discussions with MCRS management regarding the resolution of outstanding defective cable complaints, it was determined that MCRS does not appear to have a comprehensive list of all outstanding end users defective cables The MCRS presently has 860 outstanding work orders to repair defective cable. There are additional defective cables have been identified but have not yet been entered into the MCRS work order system. Therefore the 860 outstanding work orders do not represent the total number of outstanding defective cables that are awaiting repair. Therefore, many cables that are used to perform safety critical functions can remain unaddressed for a prolonged period of time.

- The MCRS serves a global community of end users that have competing needs and gives priority to repairing the most urgent or emergency complaints.

- In addition, based upon the Capital Projects two aforementioned projects regarding renewing EA boxes and the degraded condition of copper cables, there appears to be a system wide problem with the condition of copper cabling.

- Upon their arrival, FDNY personnel entered the tracks in an attempt to render immediate assistance to T/W Boggs. The third rail power on Tracks 1, 3, and 4 was still alive at the time. At the time that the FDNY entered the track they believed that there was an imminent need; therefore their actions were consistent with Policy Instruction 10.32.3. The incident was reviewed by OSS and it was determined that the required interagency protocols were followed.

- There were no mechanical or pneumatic defects identified with the car equipment.

- Currently, NYCT employees must complete a one day Track Safety training course to be permitted to enter upon the trackway. Refresher training is required every three years and is fulfilled through the use of the track safety and flagging video. The current video is entitled "Anatomy of an Incident." The practice in MOW is to view this video annually during the safety stand down. MOW flaggers are qualified through the 2 day Standard Flagging course. There is no refresher other than the aforementioned video. The BOI concluded that the current practice of refresher track safety and flagging training is insufficient to effectively communicate the significance of the track safety and flagging rules and that employees' adherence to these critical safety rules and practices is a value held by NYCT.

- A review of T/O Pouncy's training record does not reflect that he attended the required Train Operator refresher training in the last three years.

- Pre-existing medical conditions were determined not to be factors in this accident.

IV. ISSUES RESOLVED

1. On May 1, 2007, Safety Stand Down training was initiated to promote track safety awareness. All employees who perform duties on or adjacent to the Right of Way attended the training.

2. On May 15, 2007 EMD notified OSS that EA boxes 2212 through 2127 between 50th Street and 66th street have been repaired.

3. DOS developed procedure 6.0 "Communication Procedures for Emergency Work in Areas with Out of Service Emergency Alarm Boxes or Emergency Telephones" to address emergency work required to be performed in the vicinity of a non functioning EA Box / Emergency Telephone.

4. On May 14, 2007, DOS issued Maintenance of Way Bulletin No. 07-15, Positive Compliance Directive: MOW Procedure 4.0, Implementing R.T.O. General Orders to address the deficiencies in the previous DT general order implementation practices.

5. EMD provides a daily update the RCC, MOW Control, OSS and the TWU that details the non-operating EA/ETs throughout the system.

6. EMD has adopted the practice of "bagging" non-operational EA boxes. Additionally, OSS provided notification to the FDNY regarding modifications to existing NYCT procedures that

will impact their response to emergencies, i.e. the ability to identify "bagged" non operable EA boxes.

7. MTA AS performed an Emergency Alarm Box review in order to identify deficiencies in the current inspection and maintenance practices associated with EA boxes. MTA Audit Services issued five recommendations as a result of their review.

8. In response to the T/W Boggs/Franklin fatalities a joint task force comprised of DOS, OSS, and TWU representatives was established to develop initiatives to improve the culture of track safety at the NYCT.

9. Monitoring of on track safety is being performed by the joint OSS-TWU Track Safety Inspection Team and will continue into the future. Additionally DOS has established a subway safety group to audit flagging operations in the subway.

V. RECOMMENDATIONS

The Board of Inquiry Recommends:

1. The DOS must review the circumstances of this accident with all their personnel who perform duties on or adjacent to the Right of Way. This review must include a discussion with all employees and ascertain that an understanding of the issues has been reached by all.

2. DT must review the actions of M/S II Hall and take appropriate action.

3. DOS must reinforce the following rules during track safety refresher training and through bulletins: Rules 11(s), 3.71(c) 3.71(e), 3.71(i)), 3.72(b)and 3.77(a) of the Rules and Regulations Governing Employees of MTA New York City Transit, Manhattan and Bronx Surface Transit Operating Authority and South Brooklyn Railway with all DOS employees. Further and continued reinforcement must be provided through the tool box safety talks and monthly safety meetings by using a participatory process and discussion (such as case studies, practical examples, etc.) to emphasize the significance of the track safety and flagging rules, and that employees adherence to these critical safety rules and practices is a value held by NYCT. Techniques that have been presented to supervisors in the DuPont Managing Safety training shall be utilized.

4. In addition to Recommendation #3, the DOS must reinforce the following rules for all MOW employees during track safety refresher training, tool box safety talks and monthly safety meetings: Rules 17.04, 17.07 and 17.10 of the Safety Rules and Regulations for Maintenance of Way.

5. DOS must develop a Rule requiring all employees to request the RCCs' permission to access the Right of Way to perform work on or adjacent to the tracks.

6. DOS must develop and issue in the form of a positive compliance directive a bulletin instructing employees that when setting up a G.O., a separate call must be made to the RCC to request permission to set up flagging on adjacent tracks associated with the G.O. This

bulletin must be presented to employees in the tool box safety talks in the manner referenced in recommendation 3.

7. DOS must ensure that Supervisors access the work location and determine the safest route to take when setting up flags.

8. DOS must develop a more protective way for employees to set up flags.

9. DOS must define the title, i.e. a supervisor in charge of a work gang and/or tasks i.e. track walker inspections and other inspection teams that require personnel be issued radios for communication purposes.

10. DOS must establish a comprehensive list of all outstanding end user defective cables and perform an analysis to determine the appropriate staffing levels to address the number of outstanding defective cables. DOS must take appropriate action based upon the outcome of the analysis.

11. DOS must evaluate restructuring the MCRS group and assigning dedicated cable repair groups to the end user departments to promote greater accountability in repairing defective cables.

12. DOS in coordination with CP must determine if the Capital Program for replacing degraded copper cable is sufficient to address the system wide cable deficiencies and determine what changes if any must be implemented to bring the safety critical cables to a state of good repair.

13. EMD must review their practice of prioritizing defective cables to ensure that equipment used for emergencies is given the highest priority for repair.

14. EMD must implement the five recommendations provided by MTA AS in the Emergency Alarm Box Review.

15. DOS in coordination with Operation Training must evaluate and establish the frequency of periodic refresher Track Safety and Track Flagging training classes for all employees who perform duties on or adjacent to the Right of Way.

16. MOW must continue to perform the annual Safety Stand Down to promote safety awareness. The content and method of delivery must be critiqued by Operations Training to ensure its effectiveness and make appropriate changes as necessary.

17. DOS must ensure that their personnel attend the required safety and refresher training.

ATTACHMENT "A":

BOARD OF INQUIRY

KEY TESTIMONY AND INTERVIEWS

ATTACHMENT "A"

Key Testimony and Interviews

Interviews to determine the causal factors and events leading to the accident were initiated on Friday April 27, 2007, and concluded on Wednesday May 9, 2007. The Board of Inquiry heard the testimony of 18 witnesses.

T/W Denton's Testimony:

- When asked to describe that events that took place leading up to the incident, T/O Denton stated, "When we got –after we dropped the green we started walking back we got the uptown express and starting walking, we walked down toward the platform to cross over, Mr. Boggs was a few feet in front of me, he walked over to cross the track to go to the ladder, I made it to columns I seen the train and I yelled and I heard it, I watched him go under.

- T/W Denton was asked if he knew if Mr. Boggs stopped to look for any approaching trains before he entered the trackway when he was struck by the train. T/W Denton replied, "I don't know, he was a few feet in front of me and I don't know, you see your work train on site come on the site you wouldn't think there is another train so I don't know what he did, I don't know, I don't know.

- When asked if he believed that the general order was in effect, T/W Denton answered, "Yes".

T/O Pouncy's Testimony:

- T/O Pouncy was asked to describe the events that took place when the intended train route was changed. T/O Pouncy responded, "At 79 Street they told us to hold our doors open there was some problem at 66th Street so they notified us we are going to be rerouted to the express track north of 72nd Street we were rerouted to the 2 track into 72nd Street. Command center did inform me that at 66th Street there was going to be people on the track, track workers on the track proceed with caution due to the BIE investigation. From proceeding into 66th Street north of 66th I sounded my horn two long blasts and I proceeded with caution 10 miles per hour through the area all the way to north of 59th Street so I was blowing my horn every maybe 100 feet until I got to north of 59th Street when I was 5, 10 feet of that area a track worker walked was back toward the train onto the running rail, I seen his head turn like someone said something to him and he stepped foot into the gauge of the track and the train hit him, I was taking brake when I first seen him so then I hit put the train in emergency."

- T/O Pouncy was asked how far away was your train from T/W Boggs when you saw him before contact was made? T/O Pouncy responded, "I think I was approximately 5 to 8 feet, something like that".

- When asked the position of T/W Boggs when he saw him, he responded, "His back was towards me".

M/S II Hall's Testimony:

- M/S II Hall was asked if he had notified the RCC that he would be establishing adjacent track flagging before sending the T/Ws on the track. M/S II Hall replied, "No sir".

- M/S II Hall was asked if he knew if the general order flagging was called on. M/S II Hall stated, "when I seen the work train I thought everything was set up, when I did see the work train it was already here. I said oh, good, everything is set up. Usually when the work train is there we set up."

- M/S II Hall was asked if Mr. Boggs and Mr. Denton were informed that flagging protection was established on track 2 or track 3. M/S II Hall replied, "No, we were going out early we were just putting the cautions out for when we get the tracks before any of the men come down that they have protection when the G.O. is ready—I usually try to be safe to put my cautions out ahead of time so that when we get the track then we can have the men set up, come safely off the track to go over to the location."

- When asked to discuss the conversation that took place between himself and the train operator on W/T 2A, M/S II Hall replied, "He's just yelling, you know, we're looking at him like this on the platform, he said I have to go to Chambers, I have to go to Chambers. We didn't talk to him, you know, we didn't get to say are you on this job, nothing like that."

- M/S II Hall was asked to explain his action regarding his attempt to remove third rail power. M/S II Hall replied, "I immediately ran to the phone, opened the box, first time I ever did that, I hear about doing it but you never did it yourself. I opened it up and I pulled the alarm thing, it made like tick, tick, tick, tick sound like a clicking sound, then I tried calling command telling them but the line was busy." He further stated, "The bank of lights are on, I said the power ain't off, I hit the switch again, I hit the switch again, I hit the it again and again and again and the lights were still on.

  In this exchange, regarding securing the general order limits, Mr. Soucheck is asking the questions and M/S II Hall is providing answers:
  - Q. Before everything happened you never had a conversation with Larrier whether he had called the control center that you were setting up flags at all?
  - A No, I knew that he called on the G.O., he was setting up the G.O.
  - Q You knew that Larrier had called.
  - A Yes.
  - Q Had called on the G.O. and that you were setting up flags?
  - A Right, I knew that he called on the G.O. I told him to set up everything.
  - Q Do you know what time he called the command center?
  - A I think it was 10 something, I don't know the exact time, 10:30, 10, something like that.
  - Q So normally at 10:30 prior to the general order going into effect the control

center would allow you to set up adjacent flags?

- A Yes, they told us set up the G.O. and to call back when the lamps and trips
and everything was set up, that's how they usually tell us to do it call back to let us know everything is set up, we already told the men to go ahead out to go do the job.

In this exchange, regarding securing the general order limits, Mr. Lavin is asking the questions and M/S II Hall is providing the answers:

- Q Mr. Hall, when the track men go up to say the northern end of the limits how do they know that the track, that RTO surrendered the track that they could place out the lamps and trippers?
- A Call command, the foreman, the way, I don't usually do this, okay, the foreman call command and said the would like to set up lamps and trips and command says okay, go ahead set your lamps and trips up, you know, set up all your lights whatever you have to do, call us when they are set up. So they usually call Hoyt set the lights up, and Hoyt will call Larry, then the calls command back and says we are all set up.

M/S I Larrier's Testimony:

In this exchange, regarding securing the general order limits, Mr. Lavin is asking the question and M/S I Larrier is providing the answers:

- Q I just want to understand I am clear of the process that you guys used to confirm that the general order is in effect, you dispatch individuals to each and of the general order?
- A Yes.
- Q When they believe that the last train has gone through they place out the lamps and trippers they the notify your field office and at some point you contact the field office to confirm that the lamps and trips are out?

In this exchange, regarding securing the general order limits, Mr. Soucheck is asking the questions and M/S I Larrier is providing answers:

- Q Did you call to receive permission to set up that general order?
- A Yes, once you call on the general order that supposed to go into effect the men that is setting up the reds and trips they are waiting to see when the train turns out, the first train turns they go out and set up their reds and trips they call the field office, they call the field office and tell them the reds and trips are set up and then once the reds and trips are set up I call control and let them know that my reds and trips are set up and I am ready for power off.
- Q Do you know who you spoke with when you caked on the general order?
- A Mr. Sherman at 10:50.

Mr. Lavin questioning regarding securing the general order limits, continued:

- Q Can you tell us what the conversation you had with Mr. Sherman

is?

- A I called Mr. Sherman first he put me on hold and came back I told him I would like to call on G.O. #1409 and #1411 he asked me for my limits on track 2, my limits on track 3, I gave him the limits and he told me okay, make sure you call me back when your reds and trips are set up so I can take power off.
- Q Did he tell you that the tracks were yours?
- A No, I called G.O. in at 10:50.
- Q So you call the G.O. in at 22:50?
- A Yes.
- Q You tell him you are in place ready to set up the G.O.?
- A No, you are just calling the G.O. on, you have to call it on before the time it is supposed to go into effect or else you will you get hit with a late G.O. if you call in after so call on the G.O. prior.
- Q But when you have this conversation with him does he tell you have permission to set up or you are just telling him I am not sure what level?
- A No, he doesn't tell you you have permission to set up, you are just notifying him that you are calling on the G.O. and you are going to set up your reds and trips.
- Q And you based on the set up of the lamps and trips when the service diversion starts to occur?
- A Yes.
- Q Have you ever in past practice that you recollect RTO telling you that you have permission to set up or this has been a standard practice?
- A I remember one time I was in T2 and I called the G.O. on and they told me that you can't call it on yet call back later because I guess they were having a Mets game or whatever, that's the time I remember ever calling the G.O. and they told me anything different.

In this exchange regarding the conversation between M/S II Hall and T/O Lewis, Mr. Lavin is asking the questions and M/S I Larrier is providing the answers:

- Q While you were present at 59th Street did you see a work train go through the area?
- A Yes, when I came down the stairs and I was going through the gate there was a work train coming through the station.
- Q Do you recall what your belief was when you saw the work train?
- A When I saw the work train to me the motor men on the front of the work train
  he was talking to Mr., Hall I think he sail there was a problem or something on the track, they are sending him down to Chambers and Mr. Hall then replied he said that's okay, I don't need you until the end that was it.
- Q Now, at the point when you saw the work train did you believe that the general order was in effect?
- A I assumed, yes, I believed it was in effect until I heard him say that a train was going through.

T/W Emory's Testimony:

In this exchange, regarding the conversation between M/S II Hall and T/O Lewis, Mr. Lavin is asking the question and T/W Emory is providing the answers::

- Q From the time that you arrived at 59th Street, did you have a conversation or witness a conversation between the train operator and Hall?
- A Yes.
- Q Can you describe that conversation?
- A The work train pulled into the middle track, the motorman signaled me a stop. At that time, it was me, Alleyne, Level II Hall and Larrier. Brown had caught the train going south. I don't know where he was going, but he was on the train also. The motorman said, "You guys, the G.O. is not in effect. I'm going—they are sending me south to bring you back up—to bring me back on this track. There is a problem uptown and might possibly be more trains, so watch yourself," and they left.
- Q That was the extent of the conversation?
- A Yes.

Superintendent Szurlej's Testimony:

- Superintendent Szurlej was asked about his site investigation. Superintendent Szurlej reported, "When I get there the train had already been moved towards Times Square, the deceased was removed from the tracks and was on the north end of the northbound platform on track number 4. I went down to the roadbed. The investigation of the incident scene first thing I observed of the track number 4 at survey marker 243 + 25 there was one green lantern present on track number 1, at survey marker 243+25 there was three yellow lanterns present. On track number 2 at survey marker 242+70 this location was determined to be the point of impact with the deceased, Mr. Boggs, as evidenced by a blue cigarette lighter that was present on the roadbed. The cigarette lighter was void of dirt and steel dust. Also on track 2 at survey marker 242+65 there was a fresh pack of Marlboro cigarettes also found to be clean and void of steel dust, inside were several cigarettes that were not smoked and fully intact. On track2 at survey marker 242+56 there was a pair of safety glasses found. On track #3 at survey marker 242+57 there was a safety glove found. On Track 2 at survey marker 242+49 there was a second safety glove also found". Superintendent Szurlej stated that the final resting position of T/W Boggs was believed to be at survey marker 242+31.

T/O Lewis's Testimony:

- T/O Lewis was asked if he encountered any personnel along the roadbed. T/O Lewis replied, "On the platform at 59th Street." He further stated, "I believe it was a Level II. He was—I know he gave me a stop sign, I stopped and told him before he even said anything, I said—I told him that due to the BIE on 1 track they were going to possibly—the service behind us on 2 track, what they are going to probably tell us is to relay at 34th Street, come back up to 96th Street and come back into the G.O. from going—coming back south. So I, um, I relayed the message to them and continued on out of the—of the—of 59th Street on 2 track.